IMPROVEMENT OF STUDENT LEARNING OUTCOMES THROUGH RECIPROCAL TEACHING APPROACH ASSISTED BY MIND MAP AT SCIENCE LEARNING IN JUNIOR HIGH SCHOOL

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Abstract

The research was conducted to describe the improvement of student learning outcomes towards the application of reciprocal teaching approach assisted by mind map at science learning in junior high school. This type of research was Pre-experimental with a sample of 35 students at VIII-A class in SMP Negeri 17 Surabaya. The research design which used was One Pretest-Posttest Group. The results of the study were published student learning outcomes sheets. The results showed that the mastery of learning posttest questions was 83%. Based on the t-test data analysis showed a significant difference before and after using reciprocal teaching approach assisted by mind map. Improved learning outcomes based on n-gain analysis were high 60%, moderate 37%, and low 3%.The research results of implementing reciprocal teaching approach assisted by mind map at science learning in junior high school shows an increase in learning outcomes.

Keywords: learning outcomes, reciprocal teaching, mind map

INTRODUCTION

Education is a vital thing to prepare for successful people in the future in this modern era. Such a situation demands that we as the nation's successors to improve themselves and be ready to welcome the future. Based on the Minister of Education and Culture Number 22 of 2016, the learning process in educational units is carried out interactively, inspirationally, pleasantly, challenging, motivating students to actively participate, and providing sufficient space for initiatives, creativity, and independence that are in accordance with talents, interests, and physical development, as well as psychology for students. The implementation of the teaching and learning process as described is useful so that the goals of learning can be achieved.

According to Suryosubroto (2009) Learning outcomes are educational assessments of students' abilities in everything that is taught in school and concerning matters of knowledge, skills, and attitudes expressed after being assessed. For a teacher, learning outcomes can be declared successful in carrying out the learning program if most of the total students have achieved their instructional goals either specific or general constructional goals. As for students, learning outcomes are information that has a function to measure the level of students' abilities and know the completeness of achieving student learning outcomes.

One survey conducted to monitor the results of the education system that is associated with student learning achievement is PISA. The Program for International Student Assessment is designed to help the government understand and improve the effectiveness of the education system. PISA collects reliable information in comparing literacy in reading, mathematics, and science from students in a country, and understands the strengths and weaknesses of education systems in other countries. According to this survey conducted every three years, in 2015 Indonesia was ranked 64 out of 72 for science with a score of 403. Seeing the results of these scores made worry because Indonesia's competitiveness is still lower ast Asia such as top ranking and Thailand which also excels from Indonesia. On the other hand, Indonesia's ranking is classified as rising from the results of previous tests in 2012.

Based on observations at SMPN 17 Surabaya, it was found that when science learning was in class, students tended to be passive. Students do not play an active role during the learning process, students just listen without trying to explore the knowledge taught by other sources. This is also in line with the results of interviews conducted by a science teacher of class VIII at SMPN 17 Surabaya. The teacher has been able to teach the best

possible learning, but the unwillingness of students to learn the material can be seen from the interests and attention of students who are lacking because students tend to underestimate science lessons. In addition, students do learning activities in the form of memorizing and not meaningful for them so that the understanding of the science concepts learned is not well understood, true, and meaningful. This will have an impact on student learning outcomes. Problems as mentioned above need to get attention so that they can be used as improvements in the material presentation by the teacher, the approach or strategy used, and other factors. The goal is that students can understand the science concepts of science well so that student learning outcomes increase relatively well.

According to Dahar (2011: 63), mastery of concepts is part of learning outcomes in the learning component. Therefore, in the learning process students are required to be able to understand concepts after learning activities. The material taught in science learning which is about understanding concepts, one example is the circulatory system. This material is taught to class VIII students in the semester. Students are required to understand the structure and components of blood, the tools needed in the circulatory system, the mechanism of human blood circulation, in addition to interference and how to maintain circulatory health. Approaches, strategies, or methods are needed so that students can understand the concept of the material and learning outcomes increase.

Improving the ability of students to understand can be done using reciprocal teaching. Reciprocal teaching procedures are used to discuss learners cognitive strategies and help them understand texts (Palinscar, 1984: 117). This learning is one example of a constructivist approach that has been well researched based on the principles of question formulation. This approach is designed primarily for students who have low achievement in elementary and junior high schools in learning reading comprehension, involving teachers who work with small groups of students (Slavin, 2009: 14). Reciprocal Teaching emphasizes 4 active learning strategies of students, namely: asking questions, summarizing, clarifying, and predicting. The reciprocal teaching procedure are first instructs students to read reading texts in small groups, then the teacher models four strategies (asking questions, summarizing readings, clarifying important and difficult points, and predicting what has been clarified) (Nur, 2011: 50). The purpose of using reciprocal teaching is to help students become better and more independent students, as well as to increase their motivation and abilities in the teaching and learning process (Julian, 2018). Based on Nyoman Sumadi (2017) reserach, it is showed that there are differences in individual achievement significantly high using reciprocal teaching technique of collaborative learning. On the other hand, using mind maps is one of the students' cognitive learning strategies in the form of organizing. Mind map is able to focus students' thoughts on a material, meaning students are able to increase concentration in learning and being creative, creative thinking arises from a high imagination (Karyatin, 2016). This is expected to increase students' understanding and learning outcomes can increase. This can make students in the learning process become more meaningful and easily understood.

In order to overcome the problem of learning outcomes experienced by students, innovation is needed in the learning process.. This innovation will enable students to easily understand the material and improve learning outcomes. One way is to implement reciprocal teaching approach assisted by mind map. Learning with reciprocal teaching that is in line with constructivism learning principles can make it easier for students to understand the concepts through discussing with friends. This is a strong evidence-based approach to developing understanding for students and is a powerful tool for students who have a low understanding of a science material concept.

Based on the problems that have been described above, then it will be conducted a research entitled **"Improvement of Student Learning Outcomes Through Reciprocal Teaching Approach Assisted by Mind Map at Science Learning in Junior High School".**

METHOD

The main purpose of this research is describe student learning results reciprocal teaching approach assisted by mind map at science learning in junior high school. The type of research which used is *Pre-Experimental.* The research was carried out at SMPN 17 Surabaya with research subjects 35 students of class VIII-A. The research design described as follows:

$$\mathbf{O_1} \qquad \mathbf{X} \qquad \mathbf{O_2}$$

Sugiyono (2016: 74)

Explanation:

O_1 : The value of initial test before being treated
O_2 : The value of final test after being treated
X : The explementation of reciprocal teaching approach assisted by mind map at science

learning in junior high school

Student learning outcomes test sheets after learning with the application of Reciprocal Teaching were measured using instruments in the form of test items. The instrument of this research

	Shapiro-Wilk		
	Statistic	Df	Sig.
Pretest	0,116	35	0,560

is the student learning outcomes test sheet. The pretest and posttest questions given to each student were 15 multiple choice questions.

The data analysis technique in this research were t-test to find out whether there were significant differences between the pretest and posttest value, which had previously been carried out by the Normality Test to determine whether the data was normally distributed. Next, to find out whether there were significant differences between pretest and posttest with hypothesis testing described as follows:

a) Ho: There were no significant differences learning outcomes between before and after using reciprocal teaching approach assisted by mind map
b) H_1: There were significant differences learning outcomes between before and after using reciprocal teaching approach assisted by mind map

$$H_0 : \mu_1 = \mu_0$$
$$H_1 : \mu_1 \neq \mu_0$$

To prove that there is an increase in learning outcomes, a hypothesis test is needed where the value of t count (t_{count}) is compared with the value of t from the distribution table (t_{table}). If you get the result of $t_{count} > t_{table}$, then H_0 is rejected or H_1 is accepted. This shows that there are significant differences in the results of the pretest and posttest (Arikunto, 2010).

In addition, *N-gain* is used to find out how much improvement in student learning outcomes between the pretest and posttest of students using the gain index formula normalized according to Meltzer (Silviana, 2018) as follows:

$$Gain\ index < g > = \frac{posstest\ score - pretest\ score}{maximum\ score - pretest\ score}$$

After that, the normalized *gain* is interpreted according to the following criteria:

Table 1. Intepretation of *Gain* Score

Value <g>	Criteria
<g> ≤ 0,7	High
0,7> <g> ≥ 0,3	Medium
<g> < 0,3	Low

(Hake, 1998)

RESULT AND DISCUSSIONS

Learning outcomes were analyzed using t-test where the *t*-test performed Normality Test first, then analyzed using *n-gain.*

Normality Test

The normality test is used to find out that the data is normally distributed or not normal. The following is a table of results of normality test analysis:

Table 3. Results of Normality Test Data

Based on Table 3. The results of the normality test data above, the data were analyzed from the results of 35 Pretest students of class VIII-A and the average value of 37,6. The significance obtained is 0,560. Data can be said to be normally distributed if the significance is>0,05 (Pallant, 2010: 63). The value obtained is 0,560>0,05 so that it shows that the data is normally distributed.

Paired *t*-test

After the data is normally distributed, then the pretest and posttest values are tested using paired *t*-test. Paired *t*-test was used to determine whether there were differences between learning outcomes before being given learning using the reciprocal teaching approach assisted by mind maps with student learning outcomes after being given the learning.

Table 4. Paired *T*-Test Results Pretest and Posttest Student Learning Outcomes

	t	df	Probability (sig. 2-tailed)
Pretest and *posttest*	-19,237	34	0,000

In table 4. *t*-test results pretest and posttest pairs of student learning outcomes, obtained a probability value of 0,000. This value indicates that the probability value is less than 0,05 which is 0,000 <0,05. According to Pallant (2010: 246), if the probability value is less than 0,05, it can be concluded that there is a significant difference between pretest and posttest.

Besides that, it is also known that the value of *t* is 19.237, df = 34 and α = 0.05 or the level of trust is 95% so that the value of *t* table is 2.032. Based on the tables and calculations obtained that the value of $t_{count} > t_{table}$ is equal to 19.237> 2.032 then H_0 is rejected and H_1 is accepted. H_0 shows no difference after the treatment and H_1 shows a difference after being treated.

N-Gain

Student learning outcomes based on *gain* values in each student obtained a percentage increase in learning outcomes of each student by using the *n-gain* score. The following is a diagram of the percentage increase in student learning

outcomes by using the *n-gain* score based on the classification of Hake (1998):

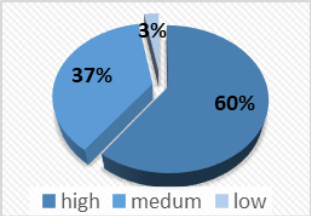

Figure 1. Percentage Diagram Improving student learning outcomes with N-Gain

The percentage categories of increasing learning outcomes with n-gain are three categories: high, medium, and low. In the low *n-gain* category the value is <0,3. In the medium category the value is ≥0,3 to <0,7. Furthermore, the high category is ≤0,7. Based on the figure 1. diagram of the percentage increase in learning outcomes of students with n-gain can be seen that in the high category there are 60%, in the medium category there are 37% and low categories there are 3% of 35 students class VIII-A.

1081/5000

Based on the data above, it shows that reciprocal teaching learning can improve student learning outcomes even though there are students who are in the medium and low category. Improvement of student learning outcomes due to students who have not understood the circulatory system material then understand after obtaining the material so that the posttest value of students increases. According to constructivist learning theory, each student must find and convert complex information into information that can be understood and accepted by themselves and become their own (Slavin, 2009). This is in line with the learning process carried out that students process information obtained from text after reading it, then formulate a question where the answer is contained on the text, then make a mind map of the collection of questions asked, and predict answers from the worksheet or predict the text about, and at the end they clarified words that were difficult to understand, so that understanding of the material was obtained.

The research conducted by Anita Dian Sukardi (2015) is in line with this research where it states that there is an influence of reciprocal teaching learning assisted by mind maps of metacognitive abilities and student learning outcomes. Furthermore, according to the results of Rokhimatul Lutfia research (2014) stated that in the application of reverse teaching learning, students enjoy their role as teachers during learning so that communication and dialogue between students can run smoothly. Learning activities do not only discuss and dialogue about material, but there are also activities that discuss the events that occur in everyday life and lead to improving students' cognitive learning outcomes.

The use of mind maps can also help improve learning outcomes. According to the research results of Harry Stokhof (2018) that guiding students' questions effectively with scenarios supported by mind maps can improve the learning outcomes of most students. However, not all students and teachers must be aware that some students may need additional support to internalize the construction of collective knowledge. The results of the Karyatin study (2016) also stated that mind mapping is able to focus students' thoughts on the material, in the sense that they are able to increase concentration in learning to be creative. With the use of mind mapping, there will be a balance of work from both hemispheres, so that student learning outcomes will increase.

CLOSURE

Conclusion

Based on the results of research that has been done it can be concluded that there is an increase in student learning outcomes. Based on the t-test data analysis showed a significant difference before and after reciprocal teaching learning assisted with mind maps. And there is an increase in learning outcomes based on n-gain analysis with a high category 60%, medium category 37%, and a low category 3%.

Suggestion

1. The application of reciprocal teaching approach assisted by mind map requires students' understanding related to making mind maps first, so that in practice students easily make mind maps on the applied reciprocal teaching approach.
2. The teacher must provide examples of the application of learning in the reciprocal teaching approach to students first so that when students play a role in leading the application of skills the approach can work well. Teachers should also monitor the performance of each group so that students are expected to gain an understanding of the material.

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